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REMARKS

Applicant has carefully studied the outstanding Office Action. The present amendment is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

The Telephone Interview

Initially, Applicants wish to thank Examiner Khanh V. Nguyen, for granting and attending the telephone interview with the Applicants' Representative Caleb Pollack (Reg. No. 37,912) on November 19, 2001. In the interview, the objected to claims 4 - 6, 8, 9, 11 - 14, 16, 18, 26, 27, 29, 30, 32, 34 and 35 were discussed. The Examiner said that the reason for all the objections to claims 4 - 6, 8, 9, 11 - 14, 16, 18, 26, 27, 29, 30, 32, 34 and 35 is that the claims depend from rejected independent claims. Applicants assume that claims 4 - 6, 8, 9, 11 - 14, 16, 18, 26, 27, 29, 30, 32, 34 and 35 include allowable subject matter and would be allowed if rewritten to include the limitations of the independent claims from which they depend and any intervening claims.

Status of the Claims

Claims 1 - 3 and 5 - 35 remain in the application. Claim 4 has been canceled without prejudice. In making this cancellation, Applicants reserve all rights in this claim to file continuation patent applications. Claims 5 - 7, 9 - 11, and 13 have been amended. New claim 36 has been added to further point out the subject matter that the Applicants regard as their invention.

Claim Objections

Claims 4 - 6, 8, 9, 11 - 14, 16, 18, 26, 27, 29, 30, 32, 34 and 35 have been objected to for being dependent from rejected independent claims. Since claim 7 is dependent from claim 4, claim 7 includes all of the limitations of claim 4. Since claim 4 includes allowable subject matter, claim 7 includes allowable subject matter and therefore Applicants respectfully assert that claim 7 should have been objected to rather than rejected under 35 USC 102(e).

Claim 4 has been cancelled without prejudice, thus rendering the objection moot.

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Claims 5 – 7 have been amended to change their dependency to new claim 36. New claim 36 includes subject matter similar to that of cancelled claim 4. Applicants respectfully assert that new claim 36 is not narrower in scope than cancelled claim 4. Claims 5 – 9 have been amended to depend, either directly or indirectly, from new claim 36. Applicants respectfully assert that this amendment does not narrow the scope of these claims. Accordingly, new claim 36 and amended claims 5 – 9 are not subject to the complete bar against the use of the Doctrine of Equivalents as outlined in Festo Corporation v. Shoketsu Kinsoku Kogyo Kapushiki Co., Ltd.

Applicants believe that claim 36 is in condition for allowance. As explained hereinabove with respect to the telephone interview, Applicants assume that claims 5 – 9 contain allowable subject matter. Amended claims 5 – 9 depend, either directly or indirectly, from new claim 36 and include all the limitations of claim 36. Accordingly, Applicants believe that claims 5 – 9 are also in condition for allowance and request that the objections to claims 5 – 9 be withdrawn.

Claims 11 and 13 have been amended to include the subject matter of the independent claim from which they depend. As explained hereinabove with respect to the telephone interview, Applicants assume that claims 11 – 14 contain allowable subject matter. Therefore, Applicants respectfully assert that amended claims 11 and 13, which are now in independent form, are in condition for allowance. Claims 12 and 14 depend from claims 11 and 13, respectively, and include all the limitations of claims 11 and 13, respectively. Therefore, Applicants believe that claims 12 and 14 are in condition for allowance. Applicants therefore respectfully request that the objections to claims 11 – 14 be withdrawn.

Applicants have provided arguments below as to why claims 15, 17, 19, 22, 24, 31 and 33 are in condition for allowance. Each of claims 16, 18, 26 – 27, 29 – 30, 32, and 34 – 35 depends, either directly or indirectly, from one of claims 15, 17, 19, 22, 24, 31 and 33, and includes all the limitations from the independent claim and any intervening claims. Therefore, Applicants respectfully assert that claims 16, 18, 26 – 27, 29 – 30, 32, and 34 – 35 are also in condition for allowance and request that the objections to these claims be withdrawn.

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35 USC 102 Rejections

The Examiner has rejected claims 1 and 22 under 35 U.S.C. 102(b) as being anticipated by DaSilva et al. (U.S. Patent No. 5,694,093) or Pinckley et al. (U.S. Patent No. 5,854,471). Applicants respectfully traverse these rejections in view of the remarks that follow.

Applicants respectfully disagree with the Examiner's statement that the quadrature network disclosed by DaSilva et al. in Fig. 4 "reads as an outphasing system" (page 2 of the Office Action). Nevertheless, the input to the quadrature network is the RF signal input 24. Applicants respectfully assert that DaSilva et al. is silent as to "varying the power of an input signal to an outphasing system" as recited in claim 1, and is silent as to "to provide a variation of the power of an input signal to said outphasing system" as recited in claim 22. Rather, DaSilva et al. teaches "a constant input level for RF input signal 24" (col. 6, lines 3 - 4). The system disclosed in DaSilva et al. does not intentionally vary the power of the input signal, but rather includes leveling amplifiers into the quadrature network in order to "accommodate changes produced by variations in the level of the input signal being put into quadrature" (col. 4, lines 18 - 20). To anticipate a claim, the reference must teach every element of the claim (MPEP 2131). DaSilva et al. does not teach every element of claims 1 and 22 and therefore cannot anticipate these claims. Accordingly, Applicants respectfully request that the rejection of claims 1 and 22 under 35 USC 102(b) as being anticipated by DaSilva et al. be withdrawn.

Applicants respectfully assert that Pinckley et al. is silent as to an "outphasing system", as recited in claims 1 and 22. Applicants respectfully assert that the apparatus disclosed by Pinckley et al. in Fig. 5 is not an outphasing system. Pinckley et al. discloses that "Where the PEP exceeds the threshold, the micro-computer 60 transmits a phase change command through an appropriate digital to analog (D/A) converter to the appropriate phase shifters 46, 56, 66. Upon receipt of the phase shift command the phase shifter 46, 56, 66 introduces 106 a phase shift into the selected carrier." (col. 5, lines 43 - 48). In Pinckley's apparatus, phase shifters 46, 56, 66 are parts of different transmitters 12, 13, 14 and are introducing phase shifts into different channels. This is not the behavior of an outphasing system. To anticipate a claim, the reference must teach every element of the claim (MPEP 2131). Pinckley et al. does not teach every element of claims 1 and 22 and therefore cannot

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anticipate these claims. Accordingly, Applicants respectfully request that the rejection of claims 1 and 22 under 35 USC 102(b) as being anticipated by Pinckley et al. be withdrawn.

The Examiner has rejected claims 1, 2, 7, 15, 17, 19 – 23, 31 and 33 under 35 U.S.C. 102(e) as being anticipated by Dent (U.S. Patent No. 6,133,788) or Dent et al. (U.S. Patent No. 6,201,452). Applicants respectfully traverse these rejections in view of the remarks that follow.

Regarding claim 7, claim 7 is dependent from claim 4 and includes all of the limitations of claim 4. Since claim 4 includes allowable subject matter, claim 7 includes allowable subject matter and therefore Applicants respectfully assert that claim 7 should have been objected to rather than rejected under 35 USC 102(e). Accordingly, Applicants therefore respectfully request that the rejection to claim 7 be withdrawn.

Regarding claims 1 and 22, Dent ('788) teaches "A converter converts the AC input signal into a first signal having constant amplitude ... and into a second signal having constant amplitude ..." (Abstract). In other words, the power of the input signal to the outphasing system is constant and not varied. Dent et al. ('452) teaches a system for converting a stream of complex numbers into a modulated radio power signal (Title). The input to the power amplifiers (12) is the same RF carrier signal, phase shifted by a phase shifter (11). Therefore the power of the input signal to the power amplifiers is constant. Therefore neither Dent ('788) nor Dent et al. ('452) teach "varying the power of an input signal to an outphasing system", as recited in claim 1, and "to provide a variation of the power of an input signal to said outphasing system", as recited in claim 22. To anticipate a claim, the reference must teach every element of the claim (MPEP 2131). Neither Dent ('788) nor Dent et al. ('452) teach every element of claims 1 and 22, and therefore Dent ('788) and Dent et al. ('452) cannot anticipate these claims. Accordingly, Applicants respectfully request that the rejection of claims 1 and 22 under 35 USC 102(e) as being anticipated by Dent ('788) and Dent et al. ('452) be withdrawn. Claims 2 and 23 depend from claims 1 and 22, respectively, and each includes all the limitations of one of the independent claims 1 and 22. Therefore, neither Dent ('788) nor Dent et al. ('452) teach

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every element of claims 2 and 23. Accordingly, Applicants respectfully request that the rejection of claims 2 and 23 under 35 USC 102(e) be withdrawn.

Applicants respectfully assert that neither Dent ('788) nor Dent et al. ('452) teach "an outphasing system with shunt reactance" as recited in claims 2, 15, 17, 19, 23, 31 and 33. Dent et al. ('452) is silent as to shunt reactance. An outphasing system with shunt reactance, as originally taught by Chireix in 1935, is one in which the branch amplifiers see different impedances. In the classic example, the output of one branch amplifier has an element with shunt reactance B_S , while the output of the other branch amplifier has an element with shunt reactance $-B_S$. The shunt resonant circuit 550 of Dent ('788) provides the same impedance to both branch amplifiers 312, 314 and acts as a harmonic suppression filter. Therefore Dent ('788) does not teach "an outphasing system with shunt reactance". To anticipate a claim, the reference must teach every element of the claim (MPEP 2131). Neither Dent ('788) nor Dent et al. ('452) teach every element of claims 2, 15, 17, 19, 23, 31 and 33, and therefore Dent ('788) and Dent et al. ('452) cannot anticipate these claims. Accordingly, Applicants respectfully request that the rejection under 35 USC 102(e) of claims 2, 15, 17, 19, 23, 31 and 33 be withdrawn. Claims 20 and 21 depend from claim 19 and include all the limitations of claim 19. Therefore, neither Dent ('788) nor Dent et al. ('452) teach every element of claims 20 and 21, and Dent ('788) and Dent et al. ('452) cannot anticipate these claims. Accordingly, Applicants request that the rejection under 35 USC 102(e) of claims 20 and 21 be withdrawn.

35 USC 103 Rejections

The Examiner has rejected claims 3, 10, 24, 25 and 28 under 35 U.S.C. 103(a) as being unpatentable over DaSilva et al. (U.S. Patent No. 5,694,093) or Pinckley et al. (U.S. Patent No. 5,854,471) or Dent (U.S. Patent No. 6,133,788) or Dent et al. (U.S. Patent No. 6,201,452). Applicants respectfully traverse these rejections in view of the remarks that follow.

Claim 10 has been amended voluntarily to include the limitation that the first method of power control and the second method of power control are methods of power control in a radio frequency power amplifier. This amendment has not been made for reasons of patentability.

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DaSilva et al. has been discussed above with respect to claims 1 and 22. That discussion is applicable here as well. An obviousness rejection requires a teaching or a suggestion by the relied upon prior art of all the elements of a claim (MPEP 2142). In DaSilva et al., the power amplifier is linear amplifier 84 (Fig. 6). Regarding claim 3, DaSilva's goal is to ensure "that the two outputs (Lo_i and Lo_q) ... have equal amplitudes" (col. 3, lines 62 - 64). Variations in the input 83 to linear amplifier 84 are supposed to arise from the program information 72, not from the output of the IQ modulator 70. Therefore, DaSilva et al. neither teaches nor suggests "varying the power of an input signal to a power amplifier when a desired output power is below a threshold", as recited by claim 3. Regarding claim 10, DaSilva et al. neither teaches nor suggests providing methods of power control. Regarding claim 24, DaSilva et al. neither teaches nor suggests "to provide a variation of the power of an input signal to said outphasing system". Moreover, claim 24 recites a radio frequency power amplifier comprising a controller. In DaSilva et al., the power amplifier is linear amplifier 84 (Fig. 6). DaSilva et al. neither teaches nor suggests that the power amplifier comprises a controller. Therefore, DaSilva et al. neither teaches nor suggests all the elements of claims 3, 10, 24. Claims 25 and 28 depend from claim 24 and include all the limitations of claim 24. Therefore, DaSilva et al. neither teaches nor suggests all the elements of claims 25 and 28.

Pinckley et al. has been discussed above with respect to claims 1 and 22. That discussion is applicable here as well. Pinckley et al. teaches and suggests a power control change only when the peak envelope power is above a threshold. Pinckley et al. discloses that "Where the PEP exceeds a threshold, parametric changes continue ... until the PEP is reduced to a point below the threshold. When the PEP again exceeds the threshold, the process is resumed. The parameter change may be ... a power control change." (col. 3, lines 20 - 26) Therefore, Pinckley et al. teaches away from the claimed invention, since claim 3 recites "varying the power of an input signal to a power amplifier when a desired output power is below a threshold", claim 10 recites "providing a first method of power control ... for a desired output power at a first range of power values which is below a threshold", and claim 24 recites "to provide a variation of the power of an input signal to said outphasing system when a desired output power is below a threshold". Accordingly, the Examiner has

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failed to make a *prima facie* case of obviousness for claims 3, 10 and 24 with the reference Pinckley et al. Claims 25 and 28 depend from claim 24 and include all the limitations of claim 24. Therefore, the Examiner has failed to make a *prima facie* case of obviousness for claims 25 and 28 with the reference Pinckley et al.

Dent ('788) and Dent et al. ('452) have been discussed above with respect to the rejections under 35 USC 102(e). That discussion is applicable here as well. Neither Dent ('788) nor Dent et al. ('452) teach "varying the power of an input signal to a power amplifier", as recited in claim 3, and "to provide a variation of the power of an input signal to said outphasing system", as recited in claim 24. Therefore neither Dent ('788) nor Dent et al. ('452) teach or suggest all the limitations of claims 3 and 24. Claims 25 and 28 depend from claim 24 and include all the limitations of claim 24. Therefore neither Dent ('788) nor Dent et al. ('452) teach or suggest all the limitations of claims 25 and 28.

Regarding claim 10, Dent ('788) does not teach or suggest two methods of power control. Rather, the desired output power is achieved by having "a signal generator for generating a first amplifier drive signal of constant amplitude and first phase angle and a second amplifier drive signal of constant amplitude and second phase angle such that the combined signals have the desired instantaneous amplitude ... of a signal to be transmitted (emphasis added)" (col. 12, lines 23 - 28). Moreover, this method of power control, described in col. 6, line 54 - col. 7, line 21, is used for all desired output powers. Dent ('788) does not teach or suggest "providing a first method of power control ... for a desired output power at a first range of power values ... and providing a second method of power control ... for a desired output power at a second range of power values", as recited in claim 10. Therefore Dent ('788) does not teach or suggest all the elements of claim 10.

Dent et al. ('452) teaches "A plurality of power amplifiers ... A combining circuit combines the outputs of the power amplifiers according to a combining ratio to produce the modulated radio power signal. Either the amplifier output level or the combining ratio or both are selected such that the modulated radio power signal is related to the numerical significance of the plurality of first and second digits" (col. 3, lines 4 - 14). In other words, Dent et al. ('452) teaches various methods for producing a desired output power from a system combining the outputs of a plurality of power amplifiers. However, these different

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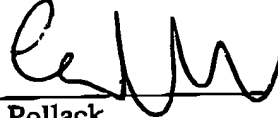
methods are used in alternative embodiments of the system (col. 3, lines 15 - 27). Dent et al. ('452) neither teaches nor suggest "providing a first method of power control ... for a desired output power at a first range of power values ... and providing a second method of power control ... for a desired output power at a second range of power values", as recited in claim 10. Therefore Dent et al. ('452) does not teach or suggest all the elements of claim 10.

In view of the preceding remarks, Applicants respectfully request that the rejection of claims 3, 10, 24, 25 and 28 under 35 U.S.C. 103(a) be withdrawn.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

In view of the foregoing amendments and remarks, the pending claims are deemed to be allowable. Their favorable reconsideration and allowance is respectfully requested.

Respectfully submitted,



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"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

In the Specification:

The paragraph starting on page 6 at line 23 has been rewritten as follows:

Fig. 2A is a graphical illustration of the efficiency $[\eta]$ of the RF transmitter of Figs. 1A and 1B as a function of the normalized output power. The outphasing system with shunt reactance has a peak efficiency at P1, and a peak efficiency at P2. When the desired output power is at or greater than a threshold, namely P1, logic controller 130 performs outphasing, setting the phase ϕ_m so that outphasing system 128 applies $+\phi_m$ to phase shifter 138 and $-\phi_m$ to phase shifter 140, thus producing an output power according to the desired value. It can be seen that when the output power is at or greater than P1, the efficiency of the RF transmitter of Figs. 1A and 1B is the same as that of a pure Chireix outphasing system.

In the Claims:

4. (Cancelled)

5. (Once Amended) The method of claim [4] 36, wherein said outphasing system with shunt reactance has a peak efficiency at an upper power at a first value of said variable phase and at a lower power at a second value of said variable phase, wherein said threshold is said lower power and said fixed value is said second value.

6. (Once Amended) The method of claim [4] 36, wherein the outphasing system is operably coupled to at least one of a radio frequency (RF) preamplifier and to an intermediate frequency (IF) amplifier and [said varying] reducing the power of the input signal comprises:

lowering a gain of at least one of said RF preamplifier and said IF amplifier.

7. (Once Amended) The method of claim [4] 36, wherein said variable phase is a collection of discrete phase values.

9. (Once Amended) The method of claim 7, wherein said outphasing system is operably coupled to at least one of a radio frequency (RF) preamplifier and to an intermediate frequency (IF) amplifier and [said varying] reducing the power of the input signal comprises:

lowering a gain of at least one of said RF preamplifier and said IF amplifier.

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10. (Once Amended) A method comprising:

providing a first method of power control in a radio frequency power amplifier for a desired output power at a first range of power values which is below a threshold; and

providing a second method of power control in said power amplifier for a desired output power at a second range of power values which is above or at said threshold,

11. (Once Amended) [The method of claim 10] A method comprising:

providing a first method of power control in a radio frequency power amplifier for a desired output power at a first range of power values which is below a threshold; and

providing a second method of power control in said power amplifier for a desired output power at a second range of power values which is above or at said threshold,

wherein said first method is reducing the power of an input signal to said power amplifier and said second method is outphasing.

13. (Once Amended) [The method of claim 10] A method comprising:

providing a first method of power control in a radio frequency power amplifier for a desired output power at a first range of power values which is below a threshold; and

providing a second method of power control in said power amplifier for a desired output power at a second range of power values which is above or at said threshold,

wherein said first method is reducing the power of an input signal to said power amplifier and said second method is outphasing and reducing the power of the input signal.

36. (New) A method comprising:

when a desired output power is below a threshold, setting a variable phase of an outphasing system with shunt reactance to a fixed value and reducing the power of an input signal to a power amplifier including said outphasing system; and

performing outphasing when said desired output power is at said threshold and above said threshold.